

REMARKS

The following uses the paragraph numbering of the Office Action. The objection in paragraph 2, regarding claims 6 and 7, is addressed below.

5. Claims 1-4, 6-12, 14 and 16-23 were rejected under Section 102(e) as being anticipated by US patent 6,195,417 (“Dans”).

Background

Interactive voice response (IVR) systems are widely used. The present invention is not concerned with either implementing the basic operation of an IVR system or with obtaining information from an IVR system (e.g., account information from a bank IVR system). The present invention is concerned with **verification** of call-flow as implemented by the IVR system.

For example, suppose an IVR system malfunctions, so that the caller is sent a **first** prompt signal including the utterance: “Please enter the desired loan amounts.”

Obviously, this utterance is erroneous and inappropriate as a first prompt (the caller and the nature of the inquiry had not even been identified yet). In response to the erroneous prompt, the caller might terminate the call and the bank or other company relying upon the IVR system would not realize that the system was malfunctioning, customers were being irritated and business opportunities were being lost.

The Invention

As concisely stated in the opening sentence of the application:

This invention relates to **testing** of interactive audio systems and, more particularly, to **verification** of content and flow of messages or prompts provided by a voice response system in the course of processing a user call. (Emphasis added.)

Fig. 8 outlines a call-flow verification method. Assume, that in Fig. 3, unit 10 represents an IVR system (whose accuracy of operation is to be verified) which is equipped to provide a variety of voice messages or utterances, each in the proper context during user calls. For purposes of example, assume the objective is for automatic call generator (ACG) unit 16 to provide simulated user calls and data inputs, and then for responsive utterances from IVR system 10 to be received back by ACG unit 16, to be compared against the content of previously stored reference utterances to identify errors. Thus, ACG unit 16 will effectively **simulate** a user in order to provide data inputs, in order to elicit prompt signals from IVR system 10 including utterances. The utterances can then be checked for discrepancies by comparison of content against the content of a correct utterance (represented by prompt data stored in advance in the ACG unit).

Pursuant to the invention, call-flow verification is arranged to operate to test operation of interactive audio systems which incorporate a call-flow verification (CFV) mode in which prompt signals are formulated with **inclusion of coded signals** which represent content of utterances.

In one embodiment such prompt signals are **composite** prompt signals which include both an utterance and coded signals framing the utterance (e.g., before and after the voice message). Examples of such composite prompt signals are shown in Fig. 7A as Prompt Signals "A" identified by the bracket on the right side of Fig. 7A. Formatting and

content of a composite prompt signal for CFV mode operation are described in greater detail on page 12 of the specification and the particular example of the prompt signals “A” is described at lines 12-24 of page 12. Other forms of prompt signals, such as versions including coded versions of the utterance but excluding the actual audio voice utterance during testing, are also described.

For efficient, high speed call-flow verification applications, use of the coded signals to represent content of respective utterances facilitates processing of prompt content. This enables avoidance of added time constraints and system complexity as would be required if voice recognition processing had to be relied upon for identification of content of received prompts.

To take advantage of efficiencies made possible by the provision of utterance content in the form of coded signals in prompt signals, applicant’s methods and apparatus provide for comparing utterance content as represented by such coded signals against correct utterance content stored in advance for use in such comparisons. A record of discrepancies identified in received prompts can be used to enable corrective action to be taken.

The Dans Patent

As concisely stated by Dans:

An automated system places telephone calls to speech-based information systems, and interacts with the systems **to retrieve information therefrom.**” (Abstract; emphasis added.)

Thus, the Dans system automatically accesses bank IVR systems or other systems to retrieve customer account information therefrom.

It is respectfully submitted that the interpretation of the Dans disclosure in the Office Action is in error.

At the top of page 3 of the Office Action, reference is made to “sending a first data input responsive to a Dial action **received from the interactive voice response (IVR).**” (Emphasis added.) However, at column 9, lines 50-53, Dans states that:

The Dial action is used to either **dial the bank** information system, or

send required digits **to the bank** information system. (Emphasis added.)

Thus, the Dans system 10 does not respond to a Dial action. As clearly stated by Dans, a Dial action is used by system 10 to **send** information **to the bank** IVR system.

As stated at lines 49-50 of column 9 of Dans, “Action” indicates action “to be taken” by system 10 and the allowable actions are “Dial, Verify Account, Verify Funds and Wait.” As indicated at the top of column 10, the digits of data “sent via DTMF tones to the bank” can be “a numeric digit”, “the checking account number”, “the check number”, etc. To initiate retrieval of customer account information, system 10:

dials the bank information system and **sends** the necessary DTMF tones to activate the bank information system’s menu, and enter the bank account number and dollar amount to be verified. (Col. 10, lines 58-62; emphasis added.)

The Dans system 10 sends the account data to the bank IVR system to enable verification of the account number, etc., by the bank IVR system. The data, in coded DTMF format, is **sent to the bank**, not received from the bank.

Thus, it is clear from Dans that the paragraph at the top of page 3 of the Office Action is in error both (a) in concluding that a “Dial action” is “received from” the bank

IVR system, and (b) in concluding that “Dial action” can read on the claim “first prompt signal.” As stated by Dans, each “Dial action” is sent by the Dans system 10 to the bank IVR system. Conversely, each prompt signal is sent by the bank IVR system and received by the Dans system 10. As described by Dans, Dial actions and prompts are distinct and go in opposite directions. A Dial action can not be a prompt.

(7) In view of the above, it becomes clear that the second paragraph on page 3 of the Office Action is also in error. The “Verify Account Action” including checking account number is not **received** by the Dans system 10. All “Action” messages are sent by system 10. In particular, the “Verify Account Action” is sent by system 10 to enable verification of the checking account **by the bank IVR system**, as required before the bank IVR system will enable the Dans system 10 to retrieve the desired account balance information.

It is therefore clear from the Dans description that “Verify Account action” can not read on the claim wording “a second prompt signal.” Also, while Dans sends a “checking account number” in coded DTMF format to the bank IVR system, the checking account number is never included in any prompt signal received **from** the bank IVR system.

With the preceding clarification of operation of the Dans system, it also becomes clear that Dans fails to teach any inclusion in prompt signals of any coded representation of a voice prompt or utterance.

With reference to the flow chart of Fig. 2, Dans describes in detail how system 10, via state machine 40,

places a call to the bank information system, enters the DTMF codes necessary to move through the system's menu tree and input the check information for the check to be verified, **recognizes the verbal messages** generated by the information system, and delivers the result of the inquiry to the resource manager 30. (Col. 6, lines 26-31; emphasis added.)

Dans describes how the recognition of such verbal messages received from the bank IVR system relies upon "voice recognition software" in order to "perform the actual speech recognition" (Col. 6, lines 32-43).

Without voice recognition processing Dans could not recognize the content of a received prompt. Dans provides no teaching that coded signals could be used to convey verbal message content for greater efficiency by avoidance of voice recognition processing and the potential errors inherent therein.

In addition, Dans is concerned with **retrieving customer information** and fails to disclose any call-flow verification method, apparatus or sequence code.

Applicant's Coded Signals

Any consideration of the present invention requires an understanding that applicant discloses modification of the content of prompt signals to be sent out from IVR systems subjected to call-flow verification. Such modification pertains at least during test periods while call-flow verification is carried out.

A standard type of bank IVR system might send out prompts which are simply voice messages (utterances) suitable for understanding by an individual calling in (e.g., "please enter your account number"). Prior to applicant's disclosure, automated monitoring of such prompts would have required voice recognition processing in order to

recognize content of the prompts. (As already discussed, Dans relies upon voice recognition processing.) Pursuant to the present invention, the need for voice recognition processing is avoided. It is avoided by providing prompt signals in which prompt content is included in the form of coded signals. As a result, processing of the coded signals enables prompt content to be recognized directly, without reliance upon voice recognition processing and free of potential errors in word recognition inherent in such processing.

This mode of operation is only possible with implementation in advance to enable inclusion of the coded signals in the prompt signals to be sent from an IVR system. The novel feature of coded utterance content in prompt signals is addressed in preambles of applicant's claims and employed by elements of such claims.

Claim Terminology

Terms used in applicant's claims include:

- "prompt signals" – these are signals sent **from** an interactive audio or IVR system;
- "utterance" – this is the voice or audio portion of a prompt signal (e.g., a verbal message);
- "content of utterance" – this may be all or a portion of the actual content or wording of an utterance (e.g., "please enter your account number");
- "coded signals" – a coded representation of all or a portion of utterance content (e.g., "please enter your account number" in coded format);
- "utterance label" – an utterance may be identified by a shortened representation of the full utterance (e.g., rather than the full utterance "please enter you account

number”, a shortened or abbreviated form or “label” may be included in coded signals to accurately represent or identify the utterance);

- an interactive voice response (IVR) system is a specific form of the more general “interactive audio system.”

The above is intended to provide a simplified overview for purposes of present discussion only and shall not be interpreted as changing or limiting in any way the description provided in the specification.

Claims 1 and 11

Claim 11 will be considered first, since it more particularly spells out the direction of messages sent to and from an interactive audio system (for example, a bank IVR system).

Step (b) refers to “receiving **from** the interactive audio system a second prompt signal” Thus, it is specifically required that this prompt signal is received **from** the bank IVR system in this example.

Step (c) then provides for “comparing content” included in the prompt signal with “predetermined content” of a correct prompt. Such comparison is carried out on the basis of an utterance label as represented **by coded signals** included in the prompt signal.

In the Office Action, at the middle of page 3, reliance is placed on validation of a customer account number. However, the account number to be verified is not sent **from** the bank IVR system as a prompt. As established above, the account number is sent in DTMF format **from** system 10 to the bank IVR system. During operation of Dans system 10 there is no comparing of content of a prompt sent **from** the bank IVR system. Further, verification (e.g., of account data) is performed by the bank IVR system.

In addition, as established above, Dans does not disclose representing verbal message content of a prompt in coded signals. As a result, Dans fails to teach any comparison involving “comparing content of an utterance label as represented by coded signals” with predetermined content of a correct utterance label, as provided in step (c) of claim 11. Without the coded content there can be no such comparison.

Thus, the method as more fully set out in claim 11 is not anticipated by Dans. As shown above, Dans fails to teach each element of the claim. Reconsideration of the rejection and allowance of claim 11 are respectfully requested.

Claim 1

While a claim must be considered in its entirety, steps (c) and (d) describe method elements not anticipated by Dans.

Step (c) refers to “receiving a second prompt signal.” This could correspond, in Dans, to a request **by a bank IVR** to enter a customer account number. Step (c) further provides that such second prompt signal includes “coded signals representing content of an utterance label.” As discussed above, applicant discloses the inclusion in prompt signals of such coded signals for call-flow verification purposes. Dans, on the other hand discloses nothing about inclusion of verbal prompt message content in coded format.

Step (d) of claim 1 provides for utilizing the coded signal representation of utterance label content received in step (c) for comparison purposes. The comparison is based on content of an expected utterance label as stored in step (a).

Having disclosed neither the requisite “receiving” of coded signals, see step (c), nor the requisite “comparing” of utterance label content, see step (d), Dans fails to teach each element by claim 1.

Thus, the method of claim 1 is not anticipated by Dans. Reconsideration and allowance are requested.

Dependent Claims 2-4, 6-10, 12 and 13

These claims, which would become allowable with allowance of their respective parent claim, include additional distinguishing elements.

For example, claim 2 provides for “activating the CFV mode by sending the CFV sequence code.” Since Dans does not disclose any inclusion of a call-flow verification (CFV) mode in an interactive audio system (e.g., a bank IVR system), Dans can not teach the activation of a CFV mode via a call connection.

The suggestion in the Office Action that an “action mode” can be activated by sending the “action sequence code” is respectfully submitted to rely upon the erroneous interpretation of the Dans disclosure discussed at length above. All “action” items relate to system 10 of Dans. Lacking any disclosure of a CFV mode, in Dans there is no CFV mode to be activated in any manner.

Claim 3 provides for providing a record of discrepancies “identified by comparing content” represented by coded signals, as provided in step (d) of claim 1. Since Dans lacks the requisite coded signals, Dans can not provide the required “record of discrepancies.”

Claim 4 provides for additional “sending”, “receiving” and “comparing” steps including comparing content “represented by coded signals included in said third prompt signal”, as more fully set out in the claim. Since, as noted above, Dans lacks the requisite coded signals, Dans can not anticipate.

Claim 6 provides for CFV mode activation by remote transmission of a CFV mode activation command. Since Dans, as discussed, fails to disclose provision of a CFV mode in any IVR system and fails to disclose any CFV mode activation command, Dans fails to anticipate. Claims 7 and 8 also relate to CFV mode activation and Dans fails to anticipate. In claim 1, the CFV mode entails coded signals representing utterance content. Without disclosure thereof, Dans can not activate the requisite CFV mode.

Claim 12, dependent on claim 11, is not anticipated for the same reasons discussed above for claim 2.

Claim 13 provides for the coded signals to “comprise DTMF tones representing utterance label characters in ASCII format.” Since Dans discloses nothing about representing utterance label characters by coded signals (DTMF, ASCII, or otherwise), Dans can not anticipate.

Claim 14

Claim 14 is directed to a call-flow verification method which, as more fully set out in the claim, includes:

In step (a), providing an IVR system having a selectable CFV mode in which “content of utterances . . . is represented by coded signals included in prompt signals.”

The Dans disclosure is discussed in detail above. Dans fails to disclose an IVR system having a CFV mode.

In step (c), the CFV mode (e.g., of the bank IVR system) is activated by the “CFV sequence code”. Dans fails to teach any IVR system which is responsive to such a code and fails to disclose such a code.

In step (f), utterance label content as represented in a received prompt signal by “coded signals” is compared against content of a correct utterance. Dans fails to teach the requisite coded signals or any prompt including such signals.

In the Office Action, at the bottom of page 5, claim 14 is discussed in the context that “entry responsive to an incoming call is represented by **coded signals included in prompt signals**” (emphasis added). It is respectfully submitted that in Dans (i) prompt signals are sent only by an IVR system and (ii) there is no disclosure of an IVR system sending a prompt signal which includes any utterance content in coded form, as required to anticipate claim 14.

Thus, Dans fails to teach each element of the claim and the invention of claim 14 is not anticipated by Dans. Reconsideration and allowance of claim 14 are requested.

Dependent claim 16

Claim 16, which would become allowable with allowance of claim 14, includes an additional distinguishing limitation. Since Dans does not teach comparing content as provided in claim 14, Dans can not provide a record of discrepancies thereby identified.

Claim 17

Claim 17 covers a call-flow verification code comprising at least an identification digit, a frame digit and an extent digit, as more fully set out in the claim. As described beginning at line 4 on page 16 of the specification, Fig. 9 shows an example of a CFV sequence code for use to activate and deactivate the CFV mode of an interactive audio system. Thus, these digits enable the CFV sequence code to provide a number of control functions, including turning the CFV mode on and off, controlling inclusion of utterances and determining how many utterance label characters are to be sent in DTMF format. As

established in the extensive discussion of the Dans disclosure provided above, no comparable code is taught by Dans.

In the Office Action, beginning at the bottom of page 6, claim 17 is discussed in a context, it is respectfully submitted, in which the submission of account data (e.g., routing code, account number, check number, transaction amount) to a bank IVR system is attempted to be equated to applicant's CFV sequence code. As stated in claim 17, the specified context is "an interactive audio system providing audio signals including utterances." Dans describes bank IVR systems of this type. However, as claimed applicant's CFV sequence code includes "at least one frame digit" indicating **whether or not** to include the utterance (e.g., the voice message) when providing an audio message which includes DTMF signals "representing the content of such utterance" (emphasis added). Anticipation would require that Dans disclose some circumstance in which there is a reason or basis expressed by Dans for providing a prompt signal wherein the utterance itself is excluded. Anticipation would also require that Dans disclose that such a prompt signal would include DTMF signals representing the content of the excluded utterance.

As described above, applicant fully discloses a reason and basis for an IVR system to send a prompt signal including utterance content in coded form for test purposes and including or excluding the actual utterance as a voice message. Dans provides no comparable disclosure. In the absence of relevant disclosure, anticipation can not be shown by arbitrary assertions attempting to reconfigure Dans to meet applicant's claims, without any support by relevant teaching of Dans.

Thus, Dans fails to teach each element of the claim and the invention of claim 17 is not anticipated by Dans. Reconsideration and allowance are requested.

Dependent Claims 18, 19 and 20

These claims, which would become allowable with allowance of claim 17, include additional distinguishing limitations. Since Dans fails to teach any CFV sequence code usable to activate a CFV mode, Dans also fails to teach digits of such a code as specified in claims 18, 19 and 20. Anticipation can not be shown by selectively picking out numeric items used for different purposes by Dans and then assigning new functions not even contemplated by Dans. For example, the Office Action discussion of claim 19 seems to suggest that system 10 of Dans can activate its own “action mode” by sending itself a numeric digit. This does not accurately reflect the Dans disclosure as established above.

Claim 21

Claim 21 covers call-flow verification apparatus “**for use in an interactive audio system**” (emphasis added). Such apparatus including both an “encoding circuit” to provide coded signals representative of utterance content and an “activation circuit” to enable activation so that prompt signals include the coded signals, as more fully set out in the claim.

For use in an interactive audio system (e.g., a bank IVR system) Dans fails to teach the claimed combination. In fact, Dans merely deals with bank IVR systems as he finds them and fails to teach any circuit or apparatus intended for use within any bank or other IVR system. The automated system 10 of Dans operates externally to bank IVR

systems to derive information therefrom. No modifications to, or **apparatus for use in**, an interactive audio system are described by Dans.

In the Office Action, at the top of page 8, reference is made to action by the “bank enrollment system” of **system 10** to provide a function controlling the format of prompt signals to be sent **by a bank IVR system**. It is respectfully submitted that this is based on the erroneous interpretation of the Dans disclosure as discussed at length above in respect to the rejection of claim 1. In fact, only the bank IVR system sends prompt signals and nothing suggested by Dans gives his system 10 any control over the format of prompt signals sent by any IVR system. The Dans operation is to retrieve account information from a bank IVR system, not to control the format of prompt signals coming from the IVR system.

Thus, Dans fails to teach each element of the claim and the invention of claim 21 is not anticipated by Dans. Reconsideration and allowance of claim 21 are requested.

Dependent claims 22 and 23

These claims, which would become allowable with allowance of claim 21, include additional distinguishing limitations.

For example, claim 22 addresses call-flow verification apparatus wherein the activation permits selection of prompt signals of different configurations. As discussed, Dans never controls the format of prompt signals, which are signals received from IVR systems.

Claim 23 covers an embodiment wherein the activation circuit enables encoder activation with all characters of an utterance label represented in coded signals. As

already established, Dans never causes an IVR system to issue prompt signals including any portion of an utterance in coded form.

The portions of the Dans specification cited in the Office Action with respect to claims 22 and 23 deal with messages sent by the Dans system 10 to elicit prompts and account information **from** a bank IVR system. There is no support for the conclusion that Dans system 10 can control the format of received prompt signals, so as to cause the bank IVR system to add coded signals to its prompt signals.

6. Claims 5, 13, 15 and 24 were rejected under Section 103 (a) as being unpatentable over Dans and in view of US patent 6,321,198 ("Hank").

Hank is relied upon as teaching that **caller** speech can be converted to ASCII format. Regardless of the relevance, or lack thereof, of Hank to the use of ASCII characters in applicant's novel composite prompt signals (e.g., including message content in coded form to facilitate testing and including or excluding message content in verbal form) the Hank disclosure fails to address the inadequacy of teaching in Dans regarding the basic elements of the respective parent claims 1, 11, 14 and 21 as described at length above.

Applicant is not claiming use of characters in ASCII format in the abstract. Hank adds nothing with respect to configurations of prompt signals disclosed only by applicant, which include utterance content in coded format. Prior prompt signals included utterances only as verbal messages comprehensible by a caller.

Thus, each of claims 5, 13, 15 and 24 is allowable for the same reasons discussed above regarding its respective parent claim. Reconsideration and allowance are requested.

3. Claims 6 and 7 were objected to because of typographical type errors. In claims 6 and 7 occurrences of "CVF" at lines 2 and 3 have been corrected to read "CFV".

In addition, a minor precedent error has been corrected in claim 14 by replacing "interactive audio" at lines 11 and 12 with "IVR" for consistency with the usage at line 2.

Similarly, a minor correction has been made in claim 17 to delete "the" in line 6. In claim 17, DTMF signals are first introduced at line 6, so that the use of "the" at this point could be questioned on a precedent basis.

SUMMARY

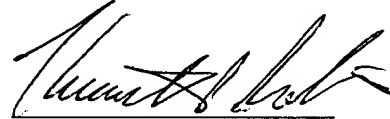
Entry and consideration of this amendment, reconsideration of all rejections and allowance of claims 1-24, as amended, are requested.

The cited references have not been shown to teach or suggest anything about call-flow verification, in general or as claimed. In particular there is no prior disclosure of use of prompt signals which include utterance content in coded format as disclosed and claimed by applicant, or of the resulting benefits provided in the context of efficient, high-speed call flow verification, with avoidance of errors inherent in reliance on voice recognition processing of received prompts. The invention as covered by the claims enables call-flow verification with benefits not suggested by the references. Consistent with this, it has been shown that the Dans reference fails to anticipate because it fails to

teach or suggest all the claim limitations and that the Hank reference fails to address the inadequacies of the Dans disclosure.

This application is considered to be in condition for allowance, which action is respectfully solicited.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read 'Kenneth P. Robinson', written over a horizontal line.

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